

Arklow Wastewater Treatment Plant Project

Environmental Impact Assessment Report

Volume 1: Non-technical summary



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1 Introduction

1.1 Introduction

This is the Non-Technical Summary of the Environmental Impact Assessment (EIA) Report for the Arklow Wastewater Treatment Plant Project, hereafter referred to as the ‘proposed development.’

This document summarises, in non-technical language, the EIA Report (EIAR) including; the likely significant effects identified, the mitigation and monitoring measures proposed as well as any residual effects arising from the proposed development that have been identified.

The location of the proposed development is outlined in **Figure 1.1**.

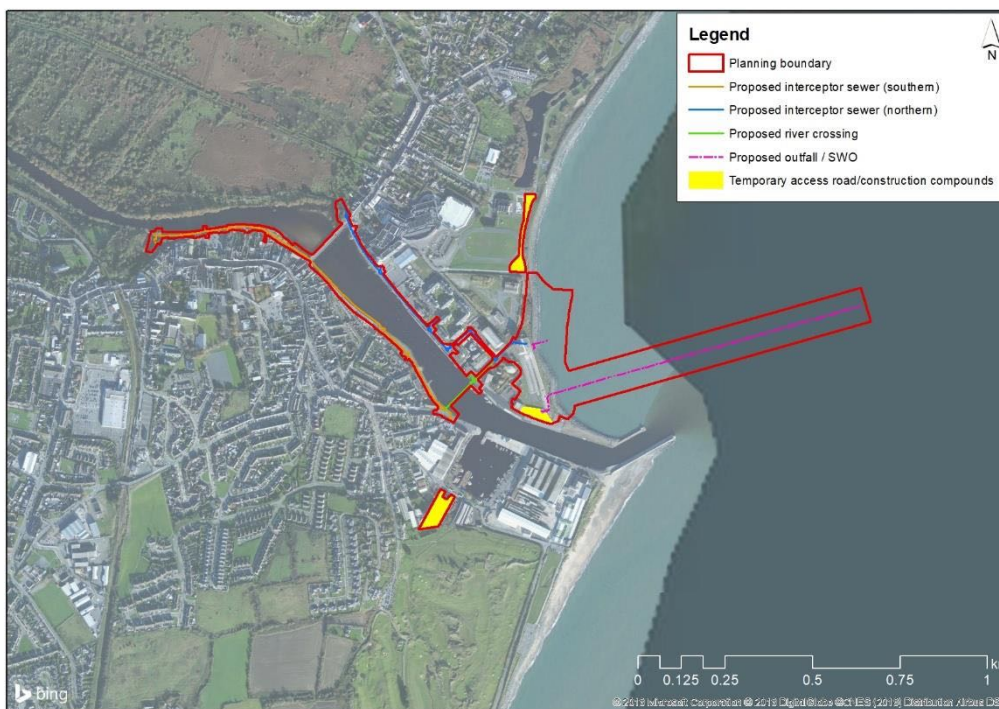


Figure 1.1: Location of the Proposed Development

In summary, the proposed development will be comprised of the following:

- Storm Water Overflow and stormwater storage at the Alps site
- A new Wastewater Treatment Plant of 36,000 population equivalent;
- Associated infrastructure for the Wastewater Treatment Plant including an inlet pumping station, a storm water storage tank, preliminary and secondary treatment facilities, sludge thickening facilities and site administration facilities (all located at the site of the Old Wallboard site at Ferrybank);

- Sewers along the quays and under the Avoca River that will tie in with the existing waste water network and bring the untreated wastewater to the Wastewater Treatment Plant;
- A Storm Water Overflow to allow for discharge of storm flows (in excess of the stormwater storage capacity) and to provide emergency relief for flows in the sewered catchment during extreme rainfall events and/or during extended power outages; thus mitigating the risk of flooding; and
- A long sea outfall pipe to discharge the treated wastewater to the sea.

1.2 Planning Process

The proposed development is of a scale that it is considered a ‘Strategic Infrastructure Development’, therefore the application for consent requires the preparation of an EIA Report. For the purpose of the EIA, Irish Water is the ‘developer’ proposing the proposed development and An Bord Pleanála is the ‘competent authority’ that will undertake the EIA and decide whether to grant consent for the proposed development.

A number of other relevant documents and licence applications, including a Natura Impact Statement, Compulsory Purchase Order (CPO) application, Foreshore Licence application and application for a Wastewater Discharge Authorisation (WWDA) have also been prepared.

2 Background

2.1 Need for the Proposed Development

There are currently no wastewater treatment facilities in Arklow town and as a result, untreated wastewater is being discharged directly into the Avoca River. This is not compliant with obligations of the European Union Urban Wastewater Treatment Directive. Further, the European Commission is currently taking a case against Ireland at the Court of Justice of the European Union for its failure to provide adequate wastewater treatment in urban agglomerations (of which Arklow is one such named agglomeration).

The proposed development will provide an effective wastewater collection network, treatment capacity and treated effluent outfall that can provide for Arklow town now and into the future. Moreover, the proposed development will improve water quality in the Avoca River and bring benefits in terms of health, environmental integrity and facilitate economic and social development for Arklow town and its surrounds, which has been constrained by the lack of adequate wastewater treatment capacity.

2.2 Site and Surrounds

The planning boundary of the proposed development is located in Arklow town, entirely within the administrative boundary of Wicklow County Council. The proposed development is located in the waterfront area of Arklow town. The site and surrounds are illustrated on **Figure 2.1**.

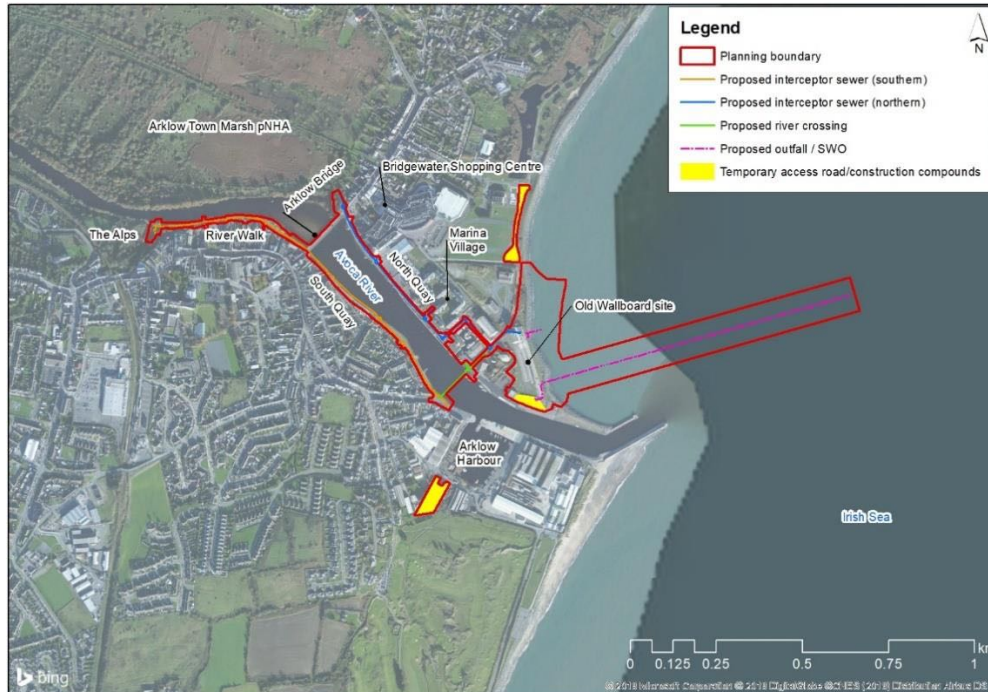


Figure 2.1: Site of the Proposed Development

2.3 Other Schemes Proposed to be Developed

A cumulative and in-combination assessment has been undertaken to consider whether any of the proposed and/or recently approved schemes in the local area have the potential to alter the significance of effects arising from the proposed development.

Eight developments within 100m of the planning boundary have been consented since 2008 and/or recently submitted and recorded in the planning system. These include:

- The demolition of existing disused buildings on Mill Road (Planning Ref: 18/316).
- Demolition of two buildings and erection of a retail and commercial building on Bridge Street (Planning Ref: 18/289).
- Construction of a relief vent stack servicing the existing above ground district regulating installation (Planning Ref: 18/251).
- Demolition of existing structures and construction of two 5 storey blocks comprising of eight retail units, 50 residential units, an on-site wastewater treatment facility and ancillary parking at Mill Road (Planning Ref: 15/857).
- Alterations & additions to existing Arklow Sailing clubhouse at North Quay (Planning Ref: 10/610009).
- Demolition of existing buildings and erection of a mixed-used development at Lower Main Street (Planning Refs: 08/610068 and 13/610028).

- Construction of a two storey dwelling with connection to mains services on South Quay (Planning Ref: 09/610054).

Further, Wicklow County Council funded by The Office of Public Works intends to construct the Arklow Flood Relief Scheme to mitigate the risk of flooding in the Arklow and Ferrybank area. The application for consent for the proposed Scheme is anticipated to be lodged to An Bord Pleanála at a later date.

There will be some physical overlap between the proposed development and the proposed Arklow Flood Relief Scheme. As such, a number of meetings were held between the design teams to ensure that the design and construction of the overlapping elements of each of the schemes could be delivered in an integrated manner in so far as possible. This particularly focused around Arklow Bridge and South Quay where there will be a physical overlap between both schemes.

There is further potential for future receptors in the study area where land use is likely to change and/or additional development is forthcoming.

Under the Arklow and Environs Local Area Plan 2018 – 2024, the ‘Waterfront Zone,’ which specifically incorporates the quays and the Wastewater Treatment Plant site, creates the potential for additional future receptors (in this case residential) in close proximity to the proposed development.

The proposed overflow and storm water storage site at the Alps is also zoned for ‘Town Centre’ development.

Two Opportunity Sites are identified in the study area- the Alps site and a site between Main Street and River Walk. The Alps site is identified for mixed-used development including significant commercial and residential development at a high density. The site between Main Street and River Walk is identified as suitable for retail, commercial and residential development at a high density.

3 Alternatives

3.1 The do-nothing Scenario

The do-nothing scenario refers to what will happen if the proposed development was not implemented and appropriate wastewater treatment was not provided in Arklow town.

From a legislative perspective alone, the do-nothing scenario is not a reasonable alternative as Ireland will continue to be non-compliant with national and European legislation. This scenario was therefore not considered further.

3.2 Alternative Locations

In October 2014, a phase 1 site selection assessment was undertaken, and 11 suitable land parcels for the proposed development were identified.

A planning search was subsequently undertaken to determine if there were any planning applications and/or extant consents, which might offer any further constraints. At the end of this screening process, 10 land parcels were identified for further assessment.

The 10 sites were then reviewed in terms of their proximity and accessibility to the identified load centre in Arklow town including feasible outfall locations and public consultation was undertaken to ascertain the views of stakeholders. Following this assessment, three sites were taken forward for detailed technical and environmental consideration. These sites were:

- Old Wallboard site at Ferrybank;
- Seabank; and
- Tinahask Upper.

The three emerging site options were then subject to an 8-week non-statutory public consultation, followed by a phase 2 site selection assessment. This assessment considered a range of technical, economic and environmental criteria. To support this assessment, a number of additional specialist surveys were undertaken, and further public consultation was undertaken, as well as consultation with An Bord Pleanála, Wicklow County Council and the EPA.

The outcome of the phase 2 site selection process identified the Old Wallboard site at Ferrybank as the emerging preferred site for the proposed development. This site was deemed to represent a suitable site in terms of technical and environmental considerations.

3.3 Alternative Layouts

Given the topography of Arklow and the termination of all outfalls at the river, the areas along the north and south quays were considered the only viable locations for the proposed sewers. No alternative locations were considered.

A river crossing will be required to transfer wastewater from both sides of the Avoca River to a single Wastewater Treatment Plant. Two locations were considered for this, with the emerging preferred option being chosen due to the minimal length of deep tunnel required to the Wastewater Treatment Plant, compared to the other location.

An outfall is required to discharge the treated effluent to receiving waters. Both marine and river outfall options were considered for the proposed development. Hydrodynamic and water quality modelling demonstrated that the wastewater discharge standards required for a river outfall will be much more onerous than that of a marine outfall. For that reason, the river outfall was not considered further.

The initial long sea outfall route selection process took account of flow currents in Arklow Bay as well as proximity to beaches, other sensitive sites and the existing General Electric (GE) sub-sea electricity cable from the Arklow Bank Offshore Wind Park. A marine site investigation was also carried out to inform the outfall route selection and design process.

The positioning and route of the proposed overflow at the wastewater treatment plant took into consideration the proposed location of the long marine outfall, the location of the existing GE power cable from the Arklow Bank Wind Park and the location of the inlet works, stormwater storage tanks and pump sump required for these excess stormwater flows.

Overflows are proposed to provide emergency relief for excess storm flows in the sewered catchment and in the event of extended power outages at the Wastewater Treatment Plant. These overflows were also chosen with a view to reducing the need to pump storm water at the Wastewater Treatment Plant. The alternative to these overflows will result in an unacceptable flooding risk in the event of extended power outage at the Wastewater Treatment Plant and also the requirement to pump large volumes of stormwater for exceptional rainfall events that coincide with high tide levels. Two overflows are proposed for this purpose, one at South Quay-Harbour Road, discharging into the Avoca River and one at the Wastewater Treatment Plant, discharging to the Irish Sea.

3.4 Alternative Processes (Technologies) for treating Wastewater

In formulating the various treatment process options, the following considerations were taken into account during the design development of the treatment processes in the Wastewater Treatment Plant:

- Relevant legislation, best practice and industry design standards for wastewater treatment;
- Information obtained as part of the consultation process;
- ELV's likely to be applied;
- Design of the collector sewer network;
- Raw water characterisation e.g. determines if alkalinity addition required;

- Plant sizing and loading;
- Site size, configuration and any planning considerations;
- Storm water volumes to be managed;
- Oxygen demand required;
- Sludge production, treatment and disposal;
- Environmental emissions i.e. effluent, odour and noise; and
- Regulatory requirements and technical specifications.

3.5 Alternative Designs

3.5.1 Architectural Design Alternatives

During the design development, four approaches were considered in terms of the potential layout of the Wastewater Treatment Plant: ‘distributed’ design, ‘stacked’ design, ‘linear’ design and a ‘stacked and linear’ design. On consideration, the ‘stacked and linear’ design option was identified as the most advantageous option for the site layout.

During the design development four façade typologies were considered: in-situ concrete, pre-cast concrete, timber and fibre cement. The fibre cement façade was considered the most advantageous façade and this design option has been adopted during the design development.

The approach to landscaping was governed by the level of contamination in the soil and the associated requirement to seal the underlying contamination and provide planting with minimal root depth.

3.5.2 Infrastructure Design Alternatives

Three design options were considered for the proposed sewer which is required to cross Arklow Bridge:

- Option 1 - lay the pipe underground between the bridge abutment and the existing buildings.
- Option 2 - lay the pipe within the river through the existing arch with the channel edge moved out to accommodate the pipe.
- Option 3 - tunnel at sufficient depth to pass under all obstacles.

Following consideration, Option 2 was considered to be the most advantageous option and was therefore selected as the preferred design option.

Three design options were also considered with regards the proposed river crossing; gravity, inverted siphon and pumped options. It was concluded that the advantages offered by the crossing operating under gravity outweighed the disadvantages, hence the gravity design was chosen as the preferred option.

The design requirements of both the overflow at the Wastewater Treatment Plant and the long sea outfall are dictated by the hydraulic profile of the proposed development through the collection network and the Wastewater Treatment Plant, as well as the design specifications required by Irish Water in terms of treatment throughput, storm water storage and network design requirements, required discharge design standards and dispersion characteristics of the receiving waters.

The upgrade of the existing revetment in the vicinity of the Old Wallboard site at Ferrybank initially considered a walkway along the crest of the revetment as an opportunity to provide community gain as part of the proposed development. During the design development, the provision of this walkway was omitted for health and safety considerations.

The foundation type for the civil structures of the Wastewater Treatment Plant buildings was determined by considering the geotechnical load carrying capacity of the soil on site and minimising the extent of the contaminated land to be excavated. Two alternative material options were also considered for the structural frames of the Inlet Works and Process buildings - steel and concrete. The contractor will ultimately be given the opportunity to decide on the preferred option.

Alternatives considered with regards the PV installation included a 'do-nothing' scenario (i.e. no installation), installation on the roof of the Inlet Works Building and installation on the roof of the Process building. Allowable height limits ultimately determined that the roof of the Process building was the preferred option.

With regard to standby power, alternatives considered included no backup power, an Uninterruptable Power System (UPS) power supply and a diesel generator. A diesel generator was chosen as the preferred option as these have been proven to be a reliable backup power source for various types of facilities and for various lengths of time, from hours to days and are therefore provided as part of the proposed development.

Given the regulatory requirements, there were no reasonable alternatives with regards building ventilation.

4 Proposed Development

4.1 Design of the Proposed Development

4.1.1 Overview

The proposed development is designed to provide appropriate wastewater treatment for Arklow town. The key aspects of the proposed development are:

- Alps overflow and Stormwater Storage Tank (approximately 400m³);
- Proposed Sewers:
 - Northern sewer (approximately 1km length, diameter range c. 525mm to c. 1500mm);
 - Southern sewer (approximately 1.1km length, diameter range c. 300mm to c. 1500mm) of which approximately 300m will be constructed in the Avoca River;
 - Underpinning of two arches of Arklow Bridge to ensure that the proposed development does not exacerbate flooding risk in Arklow town (prior to the completion of the proposed Arklow Flood Relief Scheme); and
 - Tunnelled crossing under the Avoca River (approximately 120m) and provision of an overflow at this location for excess storm flows.
- Wastewater Treatment Plant:
 - Demolition and site clearance of existing structures on the Old Wallboard site; and
 - 36,000PE Wastewater Treatment Plant providing preliminary and secondary treatment, sludge dewatering and stormwater storage at the Old Wallboard site at Ferrybank.
- Outfalls:
 - Long sea outfall (approximately 900m long) for treated effluent terminating with a diffuser; and
 - Overflow for excess storm flows.
- Upgrade of the existing rock armour revetment on shoreline adjacent to the Wastewater Treatment Plant site.

Figure 4.1 provides an overview of the key aspects of the proposed development.



Figure 4.1: Overview of the Proposed Development

4.1.2 Land Requirements

The proposed development will require temporary land take to accommodate construction activities and permanent land take to accommodate specific above ground elements of the proposed development.

Land that will be permanently acquired in order to facilitate the proposed development includes the site of the existing overflow, located in the north-east corner of ‘the Alps’ development site, and the site of the proposed Wastewater Treatment Plant at Ferrybank. Further, a range of permanent wayleaves and rights of way will be obtained to access the proposed development.

4.1.3 Alps Storm Water Overflow (SWO) and Storm Water Storage Tank

The existing overflow, located in the north-east corner of ‘the Alps’ development site will be upgraded, a stormwater storage tank will be constructed and associated site works will be undertaken to link with the existing network. Flows discharging through the overflow will be screened and the number of spills are limited in accordance with relevant standards.

4.1.4 Proposed Sewers

Sewers will be provided to the north and south of the river channel to intercept the existing sewer network and convey wastewater to the Wastewater Treatment Plant by gravity. A sewer will also be tunnelled between South Quay and Mill Road under the Avoca River (i.e. the ‘river crossing’).

The proposed sewers will meet at Mill Road to convey untreated wastewater to the Wastewater Treatment Plant for appropriate treatment and eliminate, in so far as possible, the discharge of raw sewage into the Avoca River. An overflow will be provided on South Quay to discharge excess storm flows.

4.1.5 Wastewater Treatment Plant

The Wastewater Treatment Plant will be located on the Old Wallboard Site at Ferrybank. Four stand-alone buildings are proposed as part of the Wastewater Treatment Plant, as illustrated in **Figure 4.2**.



Figure 4.2: Proposed Wastewater Treatment Plant Site Layout at the Old Wallboard site

Treatment processes will occur entirely within the buildings, however the Inlet Works and Process buildings will be connected by an underground services tunnel. Landscaping will be undertaken around the site including provision of car parking, lighting, footpaths, planting as well as connections to utilities and services.

Incoming foul flows will enter the Wastewater Treatment Plant from the proposed sewer network via an inlet works pumping station. From here, the wastewater will be pumped to the inlet works where it will undergo preliminary treatment before gravitating to secondary treatment in the Process building. The treated effluent and excess storm flows will be discharged via the long sea outfall and overflow to the Irish Sea. Excess sludge from the treatment processes will be dewatered and transported off site for further treatment and appropriate disposal.

4.1.6 Long Sea Outfall and Overflow at Wastewater Treatment Plant

A long sea outfall and an overflow at the Wastewater Treatment Plant will be provided as part of the proposed development, both discharging to the Irish Sea:

- An overflow to the north (for flows during significant rainfall events, which exceed the treatment and stormwater storage capacity and to provide emergency relief for excess flows in the sewered catchment in extreme rainfall events) to the north, discharging through the toe of the upgraded revetment to the Irish Sea;
- A long sea outfall (for treated effluent discharge) to the south that will be approximately 900m from the shoreline.

4.1.7 Upgrade of Existing Revetment

The existing rock armour revetment adjoining the site will be upgraded as part of the proposed development. The existing rock armour will be removed and subsequently replaced over a distance of approximately 350m along the coastal side of the Wastewater Treatment Plant site.

4.2 Operation of the Proposed Development

Sludge will be generated from the treatment processes and dewatered on site and transported to a sludge hub centre for further treatment and appropriate disposal. Up to one vehicle per day may be required to remove and transport the dewatered sludge.

A number of deliveries of necessary equipment and materials to the Wastewater Treatment Plant site and Administration building will also be required. It is anticipated that these vehicular movements will be minimal in the context of existing traffic levels in the local area.

When completed and operational, the proposed development is likely to employ approximately 3 - 5 personnel, some of whom will work in shifts as the facility will be operational 24 hours per day.

The proposed development will be secured by perimeter fencing with controlled access gates and appropriate security measures in place. This will restrict site access and ensure that only relevant personnel can gain access during the operation of the proposed development.

4.3 Decommissioning of the Proposed Development

The design life for the proposed development is 50 years and it is anticipated that the proposed development will be maintained and upgraded by Irish Water in line with standard policy for strategic assets of this nature. Given the importance of the proposed development to Irish Water, it is unlikely that decommissioning will be required.

However standard measures will be employed to the satisfaction of the competent authority if required to ensure that there will be no likely significant effects associated with the decommissioning of the proposed development.

5 Construction Strategy

5.1 Construction

The construction of the proposed development is estimated to occur over c. 3.5 - 4 years. The programme is divided into two main elements:

- Construction of the sewer pipe network; and
- Works associated with the Wastewater Treatment Plant and surrounding site.

Upon award, the contractor is likely to require an initial approximately 6 – 8 month period to undertake site investigations and detailed design of the proposed development. Following this period, the contractor will mobilise onsite to undertake the enabling works.

Enabling works for the proposed development will include the establishment of a number of working areas, as well as the construction of temporary site access and construction compounds.

For the sewers, a number of river working areas will be established to support construction of the pipelines, the works at Arklow Bridge and the river crossing. A temporary causeway would be constructed in this working area to facilitate these works.

The proposed overflow and stormwater storage tank will be done in parallel at the Alps site.

The sewers will be constructed using tunnelling and open cut methods. The first element of construction work (associated with the sewers) that the contractor will undertake, is the tunnelling of the sewer. The sewer will also pass under the most southern arch of Arklow Bridge with associated works required to the southernmost arch of the bridge. Underpinning and lowering of the floor of the second arch of the bridge is also required.

Prior to construction at the Waste Water Treatment Plant site, existing buildings will be subject to bat surveys and a three-month period will be allocated for the diversion or termination of existing utilities within the site. Other activities will include asbestos removal, demolition of existing structures, excavation, remediation and dewatering where appropriate including appropriate treatment and/or removal of contaminated land and ground water followed by the revetment upgrade and construction of the overflow, outfall and buildings, subsequent landscaping, testing, commissioning and connecting of the sewers.

Some 40 working areas and two construction compounds have been identified (at the Wastewater Treatment Plant site and at Arklow Harbour) and are considered to be capable of accommodating the construction of the proposed development (Refer to **Figure 5.1**).

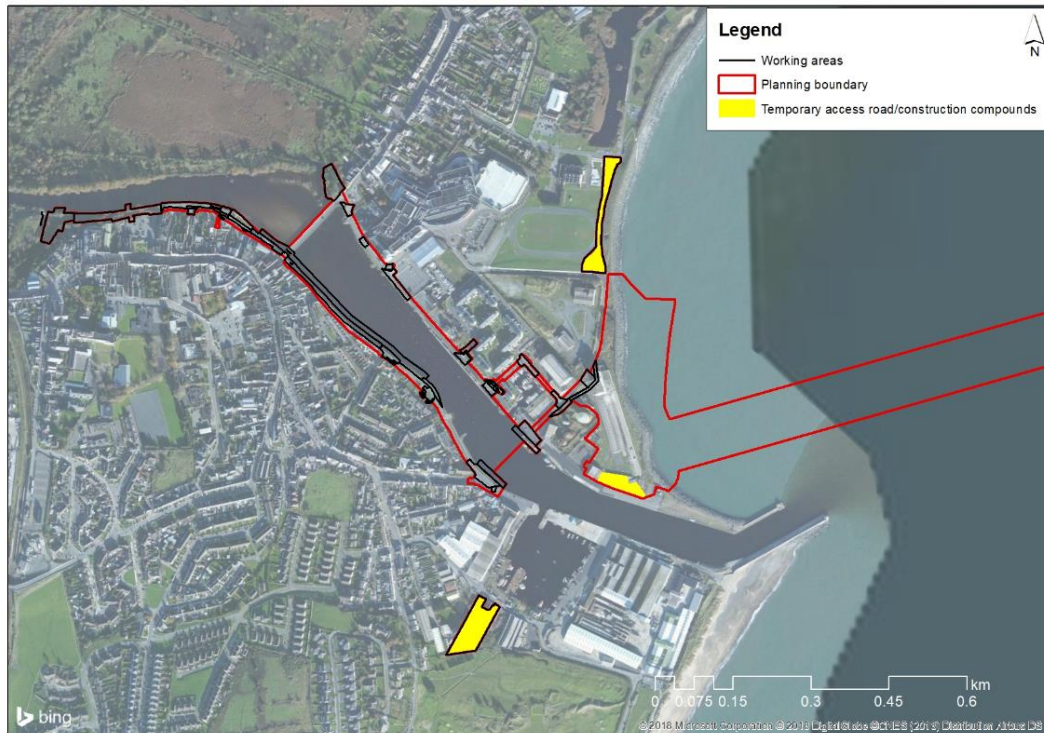


Figure 5.1: Location of proposed construction compounds and working areas

5.2 Management

An Outline Construction Environmental Management Plan (CEMP) and schedule of mitigation measures has been prepared to define the minimum standards required of the contractor. The contractor is required to integrate these measures into a Detailed Construction Environmental Management Plan following appointment (prior to the commencement of any construction activities). The contractor will also be required to prepare relevant Works Method Statements in advance of any works commencing on site.

Further, a detailed construction traffic management plan will be prepared by the contractor in advance of any works taking place on site and submitted to Wicklow County Council for approval. Traffic flows and scheduling will be appropriately planned to ensure traffic to and from the site is managed efficiently and effectively in accordance with the relevant legislative requirements.

It is anticipated that there will be c. 150 construction employees on site during the peak construction period. The core construction working hours for the proposed development will be:

- 7am – 7pm: Monday to Friday;
- 8am – 2pm: Saturday; and
- Tunnelling works will occur 24 hours a day, 7 days a week as required.

A c. 2.4m high site boundary in the form of hoarding or fencing will be established around each of the working areas before any significant construction activity commences. Site services will be installed in parallel with the rearrangement and diversion of existing utilities, where required.

Temporary compounds will be provided at discrete locations for the storage of materials. Stockpiling of materials outside of these working areas will not be permitted and management measures will be implemented to ensure effective containment and handling of all materials during construction.

6 Planning and Policy

The review of strategic, statutory and non-statutory plans demonstrates that there is a supportive and consistent policy framework in place for the proposed development.

6.1.1 National

Project Ireland 2040: National Planning Framework identifies urban wastewater as a key pressure on Ireland and advocates the need to ensure adequate treatment and capacity to avoid direct discharges. Further, the National Development Plan 2018-2027 prioritises investment in high-quality infrastructure and specifically identifies €8.5 billion investment by Irish Water over the decade.

The proposed development is supported by the Irish Water Services Strategic Plan-A Plan for the Future of Water Services 2015-2020 and the Irish Water Business Plan- Transforming Water Services in Ireland to 2021, and is in compliance with the provisions of the National Wastewater Sludge Management Plan.

6.1.2 Regional

The Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022 reinforce this policy theme. Specifically, strategic policy PIP3 outlines the need to improve water quality and seeks that investment in wastewater infrastructure is prioritised to support the delivery of the economic and settlement strategy. Further, Table 11 which identifies ‘Critical Strategic Projects – Waste Water and Surface Water’ outlines the need for the “*Development of a high-quality treatment plant for Arklow town*” under point 6.

6.1.3 Local

The Wicklow County Development Plan 2016-2022 supports the proposed development as part of a dynamic and progressive planning policy agenda to help create a safe and healthy environment whilst assisting in the protection of its natural resources. The Wicklow County Development Plan 2016-2022 recognises that deficiencies in wastewater infrastructure are a barrier to economic development and set out its objectives to improve wastewater infrastructure in County Wicklow.

The Arklow and Environs Local Area Plan 2018 – 2024 is the land use framework for guiding future development in the settlement that provides for and controls the physical, economic and social development of the settlement in the interests of overall common good and in compliance with environmental controls. The proposed development is in direct accordance with objective IT1 of the Arklow and Environs Local Area Plan 2018-2024: “*to support and facilitate the development of a waste water treatment plant in Arklow, at an optimal location following detailed technical and environmental assessment and public consultation.*”

The proposed development also aligns with the ‘Waterfront’ land use zoning and associated objectives as new infrastructure is generally supported and to be facilitated within this land use zone.

7 Traffic and Transportation

This assessment describes the likely significant effects on traffic and transportation associated with the construction and operation of the proposed development. The assessment has concentrated on construction as it is envisaged that likely significant effects during this phase will be greatest.

The surrounding street network in Arklow town is generally single carriageway streets with many supporting on-street parking and is typical of a central urban area. The assessment has concentrated on effects within Arklow town centre, particularly along the quays. Traffic counts were carried out in May 2017 on the surrounding street networks to establish baseline traffic conditions.

The busiest routes recorded during traffic counts include Ferrybank and Main Street, with lower traffic flows using the remaining streets particularly on the south side of the Avoca River. The northern section of the quays is relatively busy due to the Bridgewater Shopping Centre.

In transportation terms, construction of the proposed development can be divided into two main elements, first the construction of the Wastewater Treatment Plant itself and the second the construction of the proposed sewer network. The volume of additional traffic generation during construction has been based on the level of construction traffic activity associated with each stage of the works (i.e. deliveries on site, the removal of soil/waste from the site etc.) as well as staff activity.

The volume of operational traffic activity is based on the number of staff employed and the volume of servicing/maintenance trips associated with the proposed development.

The distribution of traffic has been based on the following:

- All construction deliveries to the Wastewater Treatment Plant and the sewer network north of the Avoca River will access and egress the works area from Junction 20 on the M11 Motorway.
- All construction deliveries to the sewer network south of the Arklow Bridge will access the works area from Junction 21 on the M11 Motorway and egress via Junction 20 on the M11 Motorway.

The construction of the Wastewater Treatment Plant will result in the temporary increase in traffic of approximately 800 passenger car units per day with peak hour traffic increases of approximately 100 passenger car units expected during both the morning and evening peak periods.

The construction of the proposed sewer network is expected to generate less traffic volumes than the Wastewater Treatment Plant with the greatest effect associated with the temporary diversion of traffic or the local management of traffic near the individual construction sites. The peak construction traffic of the sewer network is expected to generate approximately 150 passenger car units per day with peak hour traffic increases of 30 passenger car units expected.

The construction of the proposed development is expected to increase traffic flows on the wider road network (i.e. Ferrybank, Abbey Street, Arklow Bridge) by less than 5% during the peak hour periods, and by less than 3% on an all day basis. The two quays (i.e. along the quays) where the majority of the works are expected to take place are expected to have increases of approximately 15% -20% during the peak hour periods, and between 5% and 10% on an all day basis.

Based on the above, it can be concluded that construction at a wider network level will have a slight effect on traffic conditions in Arklow, however at the individual construction sites the likely effect will be more significant.

Table 7.1 presents a summary of the effects for each of the individual sewer network construction stages along with potential mitigation measures:

Table 7.1: Summary of Transport Effects of Sewer Network Construction Stages

Stage	Likely Effect	Comment
Stage A River Walk (West)	Slight Effect	Any transport effects will be local to the construction works site itself
Stage B: River Walk (Central)	Slight Effect	Some loss of on-street parking and temporary traffic management required
Stage C: River Walk (East)	Moderate Effect	Some loss of on-street parking and temporary traffic management required
Stage D: Arklow Bridge	Significant Effect	The provision of lane closures on Arklow Bridge will have significant effects on the movement of traffic and the following mitigation measures are proposed: <ul style="list-style-type: none"> No scheduled lane closures should commence before 21:00 and all lane closures should be lifted by 07:00 in the morning. The length of lane closure and the required working area needs to be made as small as possible to reduce the length of the shuttle system.
Stage E: South Quay/ South Green	Moderate Effect	There will be some diversion of traffic onto South Green and Harbour Road
Stage F: South Quay/ Harbour Road	Moderate Effect	There will be some temporary diversion of traffic onto South Green and Harbour Road
Stage G: North Quay (East of Bridgewater Shopping Centre)	Moderate Effect	There will be some diversion of traffic onto Mill Road.
Stage H: North Quay (East of Ferrybank)	Significant Effect	The closure of North Quay will require traffic divert onto Seaford Avenue and Mill Road. The following mitigation measures are proposed: <ul style="list-style-type: none"> The works are carried out during a quiet period of the year, possibly late summer however effects on tourist traffic will also need to be considered. The works should be carried out utilising a longer working day 16-24 hour basis, however the effect on adjacent residents will need to be

Stage	Likely Effect	Comment
		<p>considered to reduce the time North Quay needs to remain closed.</p> <ul style="list-style-type: none"> The junction of Ferrybank/ Seaview Avenue will need to be manned during busy periods to ensure the junction operates efficiently and safely. Parking in and around the junction Ferrybank and Seaview Avenue needs to be managed and controlled.
Stage I: North Quay (West of Bridgewater Shopping Centre)	Significant Effect	The closure of North Quay will require traffic divert onto Seafield Avenue and Mill Road. The same mitigation measures as noted under Stage H are also applicable under Stage I
Stage J: Marina Village	Moderate Effect	Some local diversion of traffic is required particularly along Mill Road.
Stage K: Marina Village	Slight Effect	Limited diversion in traffic expected.
Stage L: Marina (North)	Slight Effect	Limited diversion in traffic expected.
Stage M: Marina (North)	Slight Effect	Limited diversion in traffic expected.

The key mitigation measures to be adopted during construction include:

- The preparation of a Construction Traffic Management Plan;
- The preparation of a Consultation Plan to accompany the overall Construction Management Plan;
- The preparation of a Construction Mobility Management Plan; and
- The preparation of individual traffic management plans to include the proposed mitigation measures for Stage D, Stage H and Stage I.

In terms of other effects, construction associated with the proposed Arklow Flood Relief Scheme has the potential to effect the construction of the proposed Wastewater Treatment Plant and sewer network. There is the potential should these projects be carried out simultaneously that co-ordinated traffic management plans will need to be prepared and agreed with Wicklow County Council.

At a wider level the construction of both projects simultaneously will result in greater traffic flows, including Heavy Goods Vehicles on all the streets within Arklow and there is likely to be greater effects along both the North and South Quays where the works themselves will be concentrated.

8 Air Quality and Climate

The air quality assessment focused on the main sources of pollutants; emissions from generators used during construction, construction dust and traffic related pollutants, nitrogen oxides and particulate matter.

The traffic assessment predicts pollutants where construction traffic increases by more than 10% and where significant traffic increase due to diversions are proposed. There are two locations (North Quay and Harbour Road) where construction traffic will increase by more than 10% and two locations where significant traffic increases due to diversion will occur (South Green / Harbour Road and Seaview Avenue). At these locations, pollutant increases as a result were assessed at the nearest sensitive receptor and are considered negligible.

The likely significant effects associated with the emissions from the generator during construction are predicted as not significant.

The contractor will be required to implement standard mitigation measures during construction to minimise air quality effects, including the following measures:

- Spraying of exposed earthwork activities and site haul roads during dry weather;
- Provision of wheel washes at exit points;
- Control of vehicle speeds and speed restrictions; and
- Sweeping of hard surface roads.
- In addition, the following measures will be implemented during construction of the proposed development:
- A c. 2.4m hoarding will be provided around the site works to minimise the dispersion of dust from the working areas;
- Generators will be located away from sensitive receptors.
- Stockpiles will be located as far as possible from sensitive receptors and covered and/or dampened during dry weather.

Staff training and the management of construction activities will ensure that all dust suppression methods are implemented and continuously inspected. Dust deposition monitoring will be carried out to ensure the effectiveness of mitigation measures during construction of the proposed development.

As the proposed development will not generate any significant additional volumes in traffic, no operational assessment is required.

No significant residual effects are predicted on air quality during the construction or operation of the proposed development having regard to the effectiveness of the mitigation measures proposed above.

An assessment of the proposed development on climate was undertaken. No significant residual effect is predicted on climate during the construction or operation of the proposed development.

9 Odour

The odour assessment focuses on the potential for odour generation during the operation of the proposed development. An assessment of odour in the vicinity of the proposed Wastewater Treatment Plant and the proposed sewer vents on the interceptor sewers was carried out through detailed air dispersion modelling.

The existing wastewater network in Arklow discharges untreated wastewater from homes and business to the Avoca River. It has been reported that this existing practise gives rise to a negative odour emanating from the Avoca River.

For the operation of the proposed development, a detailed odour assessment was carried out in the vicinity of the proposed Wastewater Treatment Plant and the sewer vents. Stringent odour limits values were applied across a grid of receptors of size 10km x 10km around the proposed development.

The highest result modelled for the odour assessment is predicted to be approximately 16% of the limit value near the Wastewater Treatment Plant and approximately 11% of the limit value near the sewer vents. This shows good compliance with the proposed limit values.

No mitigation measures above inherent design measures are recommended for the proposed development and no significant residual effects are expected. Monitoring of odour from the Wastewater Treatment Plant will be undertaken during commissioning and at predetermined frequencies over the lifetime of the proposed development.

10 Noise and Vibration

An assessment of the noise and vibration effects arising from the proposed development on the existing noise environment was carried out. The baseline noise environment was determined by conducting surveys at sensitive locations in the vicinity of the proposed development. The results of these surveys indicate that baseline noise levels at all locations assessed are dominated by passing traffic, both local and distant.

The noise and vibration assessment examined multiple phases during construction of the proposed development; Wastewater Treatment Plant construction, revetment upgrade, outfall construction, sewer construction, trench shaft and tunnelling works, sheet piling and associated construction traffic.

A preliminary noise assessment for the construction phase has shown that compliance with limit values can be achieved during the majority of the works. Works associated with night-time tunnelling will however likely exceed limit values and appropriate mitigation measures to manage noise are outlined.

The traffic assessment predicts noise increases where construction traffic increases by more than 25% and where significant traffic increases due to diversions are proposed. There are three locations where significant traffic increases due to diversion will occur (South Green, Harbour Road and Seaview Avenue). At these locations, noise increases were assessed at the nearest receptor and are considered to have minor to moderate temporary negative impacts.

The relevant noise limits are predicted to be complied with during the operation of the proposed development. Following the implementation of mitigation measures to further reduce the operational noise (in the form of enclosures and acoustic screening in the Wastewater Treatment Plant), greater compliance is expected.

During construction, the contractor will take specific noise abatement measures and comply with the recommendations set out in appropriate codes of practice. In addition, specific measures which are prescribed in the Outline Construction Environmental Management Plan and will be implemented during construction include the following:

- A site representative shall be appointed to be responsible for matters relating to noise and vibration;
- Internal haul routes shall be well maintained and shall avoid steep gradients;
- Plant and vehicles shall be started sequentially rather than all together;
- Construction plant and activities to be employed on site shall be reviewed to ensure that they are the quietest available for the required purpose;
- Generators will be located away from sensitive receivers;
- Where required, improved sound reduction methods, e.g. enclosures shall be used;
- Site equipment should be located away from noise sensitive areas, as much as is feasible;

- Regular and effective maintenance by trained personnel shall be carried out to reduce noise and/or vibration from plant and machinery;
- The provision of a c. 2.4m hoarding around construction works;
- Site activities shall be limited to 7am – 7pm, Monday to Friday; and 8am – 2pm, Saturday. Tunnelling works will be carried out 24 hours a day, 7 days a week. Any working hours outside the normal construction core working hours will be agreed with Wicklow County Council. The planning of such works will have regard to nearby sensitive receptors;
- The contractor shall be required to carry out continuous noise and vibration monitoring at the three closest sensitive receptors to the site works; and
- A Communications Management Plan shall be prepared to provide for effective community liaison to help ensure the smooth running of construction activities and to address any issues that may arise.
- Any requirement for temporary re-housing (based on the threshold value for eligibility) will be confirmed by the contractor in consultation with Irish Water and the affected stakeholder. The determination for such mitigation will be made after detailed construction methodologies, phasing and detailed equipment are known. This information will be presented in the Noise and Vibration Management Plan.

During the operation of the WWTP, the relevant noise limits are predicted to be complied with for the proposed development. Following the implementation of design measures to further reduce the operational noise (in the form of enclosures, screens, ducting etc) greater compliance is expected.

The operation of the proposed WwTP will not generate significant traffic.

The residual impacts associated with the construction phase of the proposed development will result in residual impacts ranging from short term slight negative impacts to short term significant negative impacts. No significant residual impacts are predicted during the operational phase.

11 Biodiversity

Chapter 11 considered the potential effects of the construction and operation of the proposed development on terrestrial and aquatic biodiversity.

As well as reviewing existing information, a number of specialist surveys were carried out to establish the current baseline terrestrial and aquatic biodiversity in the study area. These studies included a terrestrial ecology and habitat survey, invasive species survey, bird surveys, bat surveys and aquatic ecology surveys.

Along with the EIA Report, a Natura Impact Statement (NIS) has been prepared, in line with the requirements of the European Union (EU) Habitats Directive to assess the potential impacts of the proposed development on Natura 2000 sites, particularly the Buckronev-Brittis Dunes and Fen SAC. This report concludes that, with the implementation of the proposed mitigation, there are no significant impacts on any Natura 2000 sites.

Terrestrial biodiversity within the planning boundary of the proposed development is assessed as being of high local importance upstream of Arklow Bridge, and of low local importance downstream of Arklow Bridge along both the south and north quays. This is largely due to the presence of natural river banks and mature trees along most of River Walk, which provide feeding habitat for bats. Six bat species were recorded along the Avoca River corridor, Arklow Town Marsh pNHA, and at Arklow Pond: Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Daubenton's Bat, Natterer's bats and brown-long eared bats.

22 waterbird species were recorded along the Avoca River and Estuary, at Arklow Pond, and in coastal waters, where one seabird species, Guillemot, was recorded. Gulls were the most numerous waterbirds, and were recorded in all three survey areas. Most of the gull use of the Avoca River and estuary was by birds roosting, bathing and preening; gulls use the gravel banks upstream and downstream of Arklow Bridge to roost on, and bathe and preen in the fresh water of the river. Single Kingfishers, listed in Annex 1 of the Birds Directive, were recorded on three separate occasions, flying along the northern bank of the Avoca River upstream of Arklow Bridge. Breeding birds recorded include Meadow Pipit and Grey Wagtail, Red listed as breeding birds of Conservation Concern in Ireland, and Barn Swallow, Robin, Stonechat, Starling, House Sparrow and Linnet, which are Amber listed.

The Avoca River continues to be one of the most seriously polluted rivers in Ireland due to acid mine drainage at Avoca Mines, and the estuary is also affected by the discharge of untreated wastewater. This limits the diversity of invertebrate species in the estuary and also in the adjoining coastal water. However, the river and estuary continue to support a diverse fish population, and fish that migrate through the estuary as part of their life cycle, include Habitats Directive Annex II listed species Atlantic Salmon, River Lamprey and Sea Lamprey, and the European Eel which is listed as Critically Endangered.

Otter (Habitats Directive Annex II listed species) signs were recorded along the river bank in the study area.

Grey Seals and one Harbour Seal were recorded during bird surveys of coastal waters in Arklow Bay. All Cetaceans (whales, dolphins and porpoises) are listed under Annex IV of the Habitats Directive, species that have been recorded in coastal and marine waters off Arklow include Harbour Porpoise and Bottle-nosed Dolphin, and Common Dolphin, Striped Dolphin, Risso's Dolphin, and Minke Whale – although no cetaceans were seen during site investigation works carried out in coastal waters to inform this proposed development, there is a risk to them during construction, if individual seals or cetaceans were within 500m or 1000m of specific works. Marine mammals rely on sound to navigate, to communicate with one another, and to sense and interpret their surroundings. They can be killed, injured, disturbed, or show behavioural responses by man-made noise in the aquatic environment, and mitigation will be needed to protect them from construction noise in coastal waters.

Bats and breeding birds are vulnerable to injury or fatality during felling of trees and demolition of buildings, and mitigation is required to avoid these risks. A derogation licence for works to a confirmed bat roost at Arklow Bridge has been granted. Mitigation for bats includes provision of bat boxes, lighting design, and the creation of ecological and biodiversity corridors to replace vegetation that will be removed during construction. The mitigation provided for habitats and plants that will be removed during construction aims to implement Objective NH12 of Wicklow County Development Plan 2016-2022, including *“To support the protection and enhancement of biodiversity and ecological connectivity within the plan area in accordance with Article 10 of the Habitats Directive, including linear landscape features...”*. Native species will be sown and planted to create long and short wildflower meadow, and groups and lines of trees, shrubs and climbing plants. Vegetation management and new planting is also required to prevent any spread of existing invasive plant species.

Mitigation is required to protect the aquatic environment and fish from siltation, spillages, entrapment, and other risks during construction works in and adjoining the Avoca River and Estuary. Construction materials may include concrete and cement, and leaks from construction equipment may include fuel, oils, lubricants and hydraulic fluids; these are toxic to aquatic animals.

The commissioning of the proposed Wastewater Treatment Plant at Arklow will have positive impacts on aquatic ecology. The removal of the impact of raw wastewater will result in a change to a more natural community structure, indicative of cleaner waters. This will benefit the aquatic environment and biodiversity generally and will have a positive impact on the status of the river, estuary and coastal waters. Many fish species are also sensitive to reduced water quality, and serious pollution incidents involving substances that reduce dissolved oxygen (such as raw wastewater) can result in fish kills, while chronic exposure to sub-lethal levels of pollutants can impact on overall health and reproduction. The Avoca Estuary provides habitat for adult and juvenile marine fish species and is also an important pathway for protected migratory species, such as the Habitats Directive Annex II listed Atlantic Salmon, River Lamprey, and Sea Lamprey, and for the critically endangered European Eel.

Physiological changes required to move between freshwater and seawater mean that certain migratory fish species have to spend some time in the estuarine environment before moving on, which, in the case of the Avoca Estuary, exposes them to elevated pollution levels associated with raw wastewater. The improvement in estuarine water quality that would result from the proposed development would positively impact on the fish species that use the estuary for short or long periods of time.

12 Archaeology, Architectural and Cultural Heritage

This assessment has studied the likely significant effect, if any, on the archaeological, architectural and cultural heritage resources. The assessment was undertaken by Faith Bailey of IAC Ltd and includes the results of a marine geophysical survey and diving survey, which was carried out by ADCO Ltd.

There are eight monuments recorded within the receiving environment of the proposed development. The western section of the sewer is located within the zone of notification for the historic settlement of Arklow (Recorded Monument Reference: RMP WI040-029) and the site of the ruined castle is located approximately 50m south of the proposed Alps overflow and stormwater tank.

There are 16 protected structures located within the receiving environment of the proposed development. The closest is Arklow Bridge (Protected Structure Reference: RPS A26) as the proposed sewer will pass beneath the southernmost arch of the bridge, within the river bed. The closest protected structure to the Wastewater Treatment Plant site is a masonic lodge which is located approximately 500m to the northwest.

Figure 12.1 shows the recorded monuments and structures and the proposed development boundary.

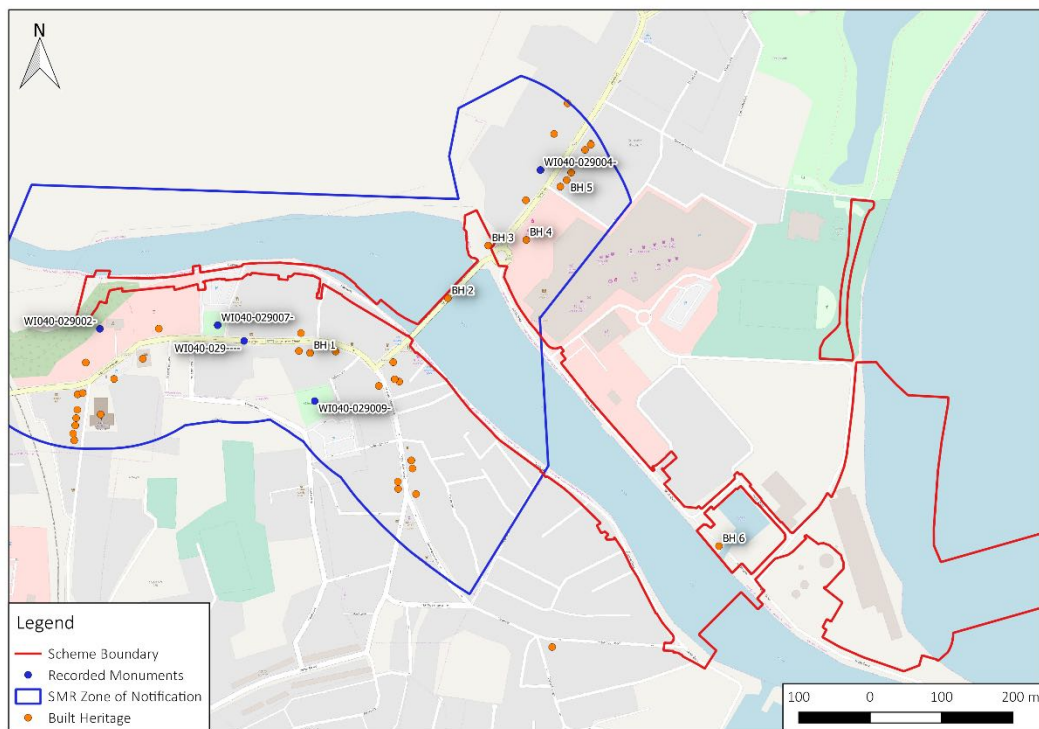


Figure 12.1: Extract from the RMP map showing recorded monuments and structures and the proposed development boundary

While there are more than 173 recorded wrecking events associated with Arklow, the Avoca River and the Arklow Coast, there are no known or recorded wreck sites within the area that was subject to geophysical survey and dive inspections. The closest site to the long sea outfall lies c. 3.1km southeast of the proposed outfall terminus. A total of five potential archaeological anomalies were identified during the course of the marine geophysical survey, which were then subject to dive inspection. None of the anomalies were found to represent archaeological remains.

Whilst it is clear that modern development within Arklow town and environs is likely to have effected upon potential archaeological resources, it remains possible that excavations associated with the laying of the proposed sewers may have a negative effect on previously unrecorded archaeological remains. Negative effects have the potential to range from significant to profound during construction.

The Wastewater Treatment Plant site is located within a reclaimed estuary and it is clear that modern construction has disturbed the site. No features of archaeological potential were noted during the excavation of site investigation pits on the Wastewater Treatment Plant site. It remains possible that excavations associated with the construction of the proposed development may have a negative effect on previously unrecorded archaeological remains. Negative effects have the potential to range from significant to profound.

In order to mitigate against any negative effects upon the archaeological resource, all ground excavations associated with the proposed development will be monitored by a suitably qualified archaeologist. This will enable the identification of any previously unrecorded features/ deposits of archaeological significance. Full provision will be made to ensure the preservation by record of any such features, should that be deemed the most appropriate manner in which to proceed, following consultation with the Department of Culture, Heritage and the Gaeltacht (DCHG).

Despite the results of the marine archaeological investigative works undertaken to date, it remains possible that disturbances to the seabed during the construction of the marine outfall, overflow and revetment upgrade, will have a negative effect of archaeological deposits that are buried at a greater depth than the areas analysed by the geophysical and dive surveys. Negative effects on underwater archaeology have the potential to range from significant to profound during construction.

It is possible that excavations associated with the underpinning of Arklow Bridge, may have a negative effect on previously unrecorded archaeological features or deposits that remain buried within the river bed. Negative effects on the archaeological resource have the potential to range from significant to profound during construction.

All riverbed/ sea bed excavations associated with the proposed development will be monitored by a suitably qualified archaeologist. This will enable the identification of any previously unrecorded features/ deposits of archaeological significance. Works will be carried out under licence to the DCHG and full provision will be made to ensure the preservation by record of any features that may be identified, should that be deemed the most appropriate manner in which to proceed, following consultation with the DCHG.

All archaeological works during construction will be carried out under the supervision of a project archaeologist, appointed on behalf of Irish Water, to ensure all mitigation measures are implemented.

The proposed sewer will be constructed beneath the southernmost arch of Arklow Bridge (Protected Structure Reference: RPS A26). In order to carry out these works and to mitigate against potential flood risk two arches will require underpinning and the fabric of the structure will also require grouting.

It is possible that the proposed techniques may have a negative effect on the fabric of the bridge structure during the course of the underpinning works. Effects on architectural heritage during construction have the potential to range from Slight to Profound and may result from movement of loose masonry if grouting is over-pressurised; structural damage / settlement if underpinning is not carried out correctly; and structural damage due to associated vibration during piling technique.

All works to Arklow Bridge will be carried out under the supervision of a conservation engineer. A full assessment of potential effects will be undertaken once the preferred methodology has been selected for the underpinning works. This will lead to the production of a construction method statement that will ensure the historic fabric of Arklow Bridge is maintained throughout construction.

No likely significant effects on archaeology, architectural and cultural heritage are anticipated during the operation of the proposed development.

13 Landscape and Visual

This assessment considers the proposed landscape and visual effects from the proposed development. Following an extensive site selection process and consultation periods, the site of the existing Old Wallboard facility at Ferrybank was selected as the preferred option for the proposed Wastewater Treatment Plant. Design of the facility for this site, including its interface with the coastal revetment, was also an extensive and iterative process, again including consultation, and the proposed Wastewater Treatment Plant development is the result of that process.

As well as the Wastewater Treatment Plant, the proposed development also includes the construction of a network of sewers connecting the existing sewers in Arklow town to the new facility and ensuring capacity and connectivity for future new development. New sewers are to be installed underground along the North Quay and South Quay, and also along River Walk.

The Landscape/Townscape and Visual Impact Assessment considers the existing site area and the landscape and visual context of the town, and identifies the nature and scale of potential impacts of each aspect of the proposed development – both during construction, and when in operation.

Development of the Wastewater Treatment Plant will result in demolition of the existing Old Wallboard facility, and replacing it with the new Wastewater Treatment Plant. This will give rise to substantial change at Ferrybank, altering the skyline and the existing derelict industrial appearance of the area, and will introduce a contemporary industrial element in its place. The Arklow Local Area Plan anticipates substantial further redevelopment at Ferrybank that will include more intensive mixed use waterfront development at this location.

Development of the sewer network will include construction activity along the quays and riverbank. Construction work by its nature is temporary or short term, and will result in localised disruption as working compounds are established, operated and decommissioned at different locations along the overall working area. Construction will be ‘rolling’ so that activity will be focussed on individual areas before moving on to the next, thereby keeping local disruption to shorter periods of time. The existing South Quay wall from Arklow Bridge to South Green is to be replaced with a new quay wall set c. 6.0m out from the existing quay wall. This will result in a wider quayside that will incorporate a new grass amenity strip between the South Quay road and the new quay wall.

Following construction along the quays and riverbank, the roads, pavements and amenity areas will be restored to their pre-construction condition. Any trees removed for the purpose of construction will be replaced with new trees of the same species.

Following completion of the construction works, and implementation of all of the restoration works, the main change at Arklow will be the absence of the existing Old Wallboard facility and the new Wastewater Treatment Plant in its place. It is predicted that the overall landscape/townscape and visual effect will be moderate and neutral.

14 Land and Soils

This section describes the likely impacts of the proposed development on land and soils (i.e. soils, geology and hydrogeology).

The study area for this land and soils assessment extends 2km from the proposed development boundary. A baseline environment was established from publicly available information, site walkovers and site investigation.

The soils and subsoils in the study area along the interceptor sewers and the overflow and stormwater storage tank at the Alps site, mainly consist of made ground which refers to soil which has either been altered or placed by man. Beneath the made ground the material consists of glacial deposits and alluvium. As a result of the site being adjacent to a river, alluvium is present along the alignment. Alluvium refers to a deposit of clay silt and sand left by flowing floodwater in a river valley.

Underlying the made ground, the subsoils also consist of sand and gravels which become more prevalent closer to the sea. These deposits are overlying rock which is found at the surface or near the surface at the proposed overflow and Stormwater Tank at the Alps site, but reduce in depth to undetectable at >15m below ground level closer to the sea. No significant soil contamination was found at the Alps overflow and stormwater tank or along the interceptor sewers.

At the Wastewater Treatment Plant site, the geological and hydrogeological features of importance include potentially contaminated land and groundwater; gravel and bedrock aquifers; and marine sediments. Contaminated land was designated a 'High' importance ranking, both aquifers were designated a 'Medium' importance ranking and the marine sediments were designated a 'Low' importance ranking.

Soils in the study area is identified as being of low importance.

A conceptual site model was created based on this information. This in turn determined the baseline environment to be a Type B environment i.e. naturally dynamic hydrogeological environment.

Potential impacts of the proposed development were assessed based on this environmental setting.

The impact assessment identified works required during the construction phase which may have an impact on the baseline environment. These included earthworks; storage or transmission of leachable and/ or hazardous materials; lowering of groundwater levels by pumping or drainage; excavation of materials above the water table and excavation of materials below the water table. During construction, these works may have an effect on the baseline environment due to:

- haulage of earthworks;
- compression of substrata;

- excavation of soft soils;
- loss of grassland, topsoil or overburden and made ground;
- loss of solid geology;
- installation of sheet piles;
- dewatering within the gravel and bedrock aquifers;
- a change in groundwater flow;
- a change in groundwater and river water levels;
- infilling of the river channel;
- pollution from construction activities;
- removal of contaminated soils;
- mobilisation of contaminated sediments and an impact on water quality.

Mitigation measures will include a project-specific Construction Environmental Management Plan (CEMP) during the construction phase. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All excavated material would be disposed of at a suitable licensed facility in respect of which a waste permit or a waste licence is granted. Due to contamination of the groundwater it will not be possible to discharge directly into the Irish Sea. The strategy for removing groundwater from the site is likely to comprise either tankering off site to a suitable licenced facility in respect of which a waste permit or a waste licence is granted or treatment on site.

Appropriate storage will be put in place to prevent the accidental release of hazardous materials. Mitigation during the construction phase will include implementing best practice during excavation works to avoid sediment running into the River Avoca and the Irish Sea.

The magnitude of these potential impacts was determined to range from negligible to small adverse with the significance of the impacts ranging from imperceptible to slight.

The impact assessment determined that the operational phase of the proposed development would have an overall neutral long-term impact on the land and soils.

Potential impacts associated with the operational phase include:

- accidental spillage of potentially polluting substances;
- leakages from foul sewers or tanks and a change in groundwater flow due to subsurface structures such as pipes.

The risk of these potential impacts is considered to be low. The potential effects of these impacts are considered to be negligible with an imperceptible significance.

Implementation of mitigation measures accounting for each of these potential impacts as well as proposed monitoring during the operational phase, will lower the impact effects to negligible with an imperceptible significance. No residual effects of significance on land and soils have been identified.

15 Water

15.1 Hydrology, Water Quality and Flooding

This assessment considers the likely effects associated with the construction and operation of the proposed development on both surface water quality and the existing hydrological regime, including flood risk. The Avoca River is known to be affected both by the acid mine drainage from the Avoca mines and the discharge of untreated wastewater from Arklow Town. Arklow has also experienced historical significant flooding events (both pluvial and tidal flooding) and a flood relief scheme is planned (Arklow Flood Relief Scheme). This gives the context for the assessment.

A desktop review was undertaken of available information from the EPA, Inland Fisheries Ireland and other sources. The Avoca River/Estuary falls under 'Transitional Waters' and is deemed to be 'Intermediate' water quality status. The surface water quality of the Avoca River within the study area was found to have a Q value of less than 4 which is classed as 'polluted' and was determined as 'unsatisfactory' condition by the EPA. The overall Water Framework Directive status of the Avoca River within the study area was 'Moderate'.

Drainage catchment topography has been used to establish drainage characteristics within the study area. The baseline data has been used to establish flood routes, levels and storage areas within the study area. A detailed hydraulic modelling exercise of the Arklow wastewater network incorporating the proposed development was carried out to determine the flooding effects. This information was then used to identify the likely significant effects that the proposed development may have on the hydrological regime and flooding in the study area.

The proposed development is located in Flood Zone A and therefore is at the highest risk of potential flooding (i.e. is vulnerable to a 1 in a 100 year flood). It should be noted however, that the site of the Waste Water Treatment Plant, is not within the historic floodplain.

Likely significant effects on hydrology, water quality, drainage and flooding during construction of the proposed development were assessed. A summary of the likely significant effects are as follows:

- A rise in flood levels is predicted due to construction of the temporary causeway and permanent encroachment in the Avoca River. It should be noted that the two southernmost arches of Arklow Bridge will be underpinned and the second arch will be lowered by 1m to eliminate the increase in flood levels upstream of the Arklow Bridge and mitigate any increased flood risk associated with the construction of the sewer in the Avoca River. Downstream of the bridge, while there will be a predicted (minor) increase towards the upstream end of the sewer encroachment, this is not critical, as the existing quay walls are sufficiently elevated to prevent overtopping.
- The construction activities associated with the enabling works including the diversion of utilities and services, temporary stock piling etc could potentially effect the hydrology and flooding regime.

- Site drainage including runoff and erosion from site excavation, earthworks release of bentonite slurries, concrete washings and associated stockpiles is likely to effect water quality if not mitigated;

Mitigation during construction will include standard best practice measures in the Outline Construction and Environmental Management Plan for the proposed development and will ensure that no significant negative effects will result during construction.

In summary, with the underpinning and lowering of the second bridge arch by c. 1m, a minor reduction in the overall flood extent was predicted for the approximately 6m wide permanent encroachment in the Avoca River which would be a long-term slight positive effect.

With the implementation of the mitigation and monitoring measures, the residual effects will be short term slight negative effects during the construction of the proposed development. During operation, the proposed development will eliminate, in so far as possible, the need to discharge untreated wastewater into the Avoca River and thus will have a significant positive effect on surface water quality.

In summary, the proposed development will eliminate the discharge of untreated wastewater into the Avoca River (excluding discharges via overflows which will be compliant with Irish Water standards). The proposed development will therefore result in a long term significant positive effect on surface water quality.

15.2 Coastal Processes

This assessment considers the likely significant effects of the proposed development on coastal processes. The assessment consists of a desktop study based on historical information, aerial photographs and results from the wave model for the site.

The assessment concludes that there is potential for dispersion of material during excavation and dredging. However, any potential dispersion of material is expected to be naturally deposited locally and mostly limited by both the harbour entrance at the south and the natural headland at the north. Excavated sediment may either be reinstated in front of the toe of the revetment or disposed of at a suitably licensed facility off-site.

The likely effect of dispersing material on coastal processes as a result of the revetment upgrade is considered to be not significant during construction and operation in that the coastline has already been fixed by the existing rock armour revetment and the upgraded revetment will follow this same alignment. The revetment upgrade will ensure coastal protection within the site for the storm return period (500 years) as it has been designed to protect against wave overtopping and satisfy functional and safety requirements.

As the proposed overflow at the Wastewater Treatment Plant terminates at the toe of the revetment, there are no significant effects predicted during either construction or operation.

During the construction phase of the long sea outfall, the reasonable worst-case effects, which relate to a high rate of sediment dispersion, are identified as follows:

- Local turbidity resulting in suspension of sands, causing its dispersion by waves and currents.
- Deposition of this material within the local coastal area, slightly increasing the overall volume of seabed material in the adjoining area.

As the volumes of excavated material are considered to be relatively low, it is not predicted that the reasonable worst case will affect the overall coastal patterns. No erosion or accretion of adjoining areas is expected to be derived from this. No negative effects on any receptors of sediment transport (emerged beach or dunes) are anticipated given the very limited increase of the material that could be transported.

The long sea outfall will require scour protection measures to protect the outfall once operational (except in the case of the horizontal directional drilling method being used). The scour protection consists of a concrete mattress layer embedded in the existing seabed. The scour protection will be designed to match the seabed level to avoid the creation of a sediment transport barrier. The scour protection will also stabilise and prevent the movement of seabed material in the local area of the outfall.

On this basis, no change in the existing coastal processes involving erosion or accretion of the adjoining coastal areas is expected due to the presence of this outfall and therefore no significant effects are likely during operation of the proposed development.

16 Resources and Waste

An assessment of the likely significant effects of waste generation from the proposed development was undertaken. A desk study was carried out including a policy and legislation review and a review of current practice for waste management in Ireland. A description is provided of waste generation during the demolition, excavation, construction and operation of the proposed development.

An estimated 23,500 tonnes of surplus demolition materials will be generated from demolition of buildings and structures at the Wastewater Treatment Plant site. A large portion of demolition waste is expected to be inert waste such as concrete, brick and glass. Where separation of plastics, steel, cabling etc from inert waste is not possible this is classified as non-hazardous waste.

An estimated 220,000 tonnes of excavation material requiring removal from site will be generated as a result of the proposed development over an estimated three and a half to four-year construction program. Of this, an estimated 35,000 tonnes will be generated from the Old Wallboard site and will be categorised as either non-hazardous or hazardous. This leaves a further estimated 185,000 tonnes of surplus excavated material which will need to be removed from the site during construction of the proposed development.

Topsoil, soil, rock and naturally occurring excavation material excavated in the course of construction activities will be reused within the proposed development where feasible subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use.

Where material is delivered off site for storage, reuse, recovery or disposal the contractor will ensure that the appropriate waste authorisation is in place (i.e. EPA Licence, Waste Facility Permit or Certificate of Registration). Case studies of a number of waste facilities were undertaken to determine their feasibility and capacity for recovery and disposal of excavation material from the proposed development. Waste from the proposed development will be transported by authorised waste collectors.

In addition, the proposed development will yield construction waste (hazardous and non-hazardous) such as surplus concrete, unusable or damaged pipe segments which may arise on site and drilling waste containing bentonite.

During operation of the proposed development wastes such as sludge, maintenance and office wastes will also be generated. The design life of the proposed development is 50 years and should the plant be decommissioned in the future resulting wastes will primarily comprise construction and demolition wastes.

The likely significant effects of the proposed development in terms of waste management prior to implementation of mitigation measures are as follows:

- The effect of demolition waste is expected to be moderate, negative and short-term.

- The effect of excavation waste is expected to be moderate, negative and short-term.
- The effect of general construction waste is expected to be slight, negative and short term.
- The effect of operation waste is expected to be imperceptible.
- The effect of decommissioning waste is expected to be moderate, negative and short term.

Mitigation measures are recommended to minimise the effect of waste on the environment, reduce the quantity of waste sent for final disposal and to promote sustainable waste management practices. Management of waste and surplus excavation material will be at the discretion of the contractor who will be required to conform to relevant statutory requirements and the mitigation commitments made in the EIA Report.

Following implementation of the mitigation measures the residual effects of the proposed development will be as follows:

- The residual effect of demolition waste is expected to be slight, negative and short-term.
- The residual effect of excavation waste is expected to be slight, negative and short-term.
- The effect of general construction waste is expected to be imperceptible and short term.
- The residual effect of operation waste is expected to be imperceptible and long term.
- The residual effect of decommissioning waste is expected to be slight, negative and short term.

Implementation of best practice mitigation measures as proposed, will minimise waste being delivered to landfill and facilitate a high level of recycling and recovery of waste arising from the construction and operation of the proposed development.

17 Population and Human Health

The construction of the proposed development, principally the cut and tunnelling works for the proposed sewers on the quays and the river crossing, will have a negative economic effect on some businesses beside the Avoca River. These include restaurants and cafes that have a degree of dependence on views of the river or parking in the area which will be affected by construction noise and the loss of visual amenity due to the erection of safety hoarding between publicly accessible areas and the works.

Temporary access diversions to some businesses will also be necessary, including the Bridgewater Shopping Centre and businesses on the quays, although the effects of these access arrangements can be mitigated. Pedestrian and vehicle access across Arklow Bridge is also likely to be affected by temporary closures of one lane or footpath and this too will affect access and journey amenity, although access will be maintained.

There will be effects on pedestrian journey amenity in the Alps along the riverside west of Arklow Bridge due to temporary severance arising from the closure of part of Châteaudune Promenade for the duration of the works at this location, although alternative access will be available from Vale Road.

General amenity use of the quays will be affected by construction of the proposed sewers. This will include significant negative temporary direct effects on green space, and in some instances, private land, affronting private residential properties in the vicinity of South Green. The proximity of works and associated noise and temporary loss of views of the river, together with temporary access arrangements, will affect other private residences along the quays including the Marina Apartments. However, following construction, improved footpaths and landscaping will enhance the urban realm along the quays.

Human health aspects are primarily considered through an assessment of the environmental pathways by which health may be affected such as air, noise, etc. The assessment of human health impacts therefore draws on the findings of other sections of the EIA Report, as necessary. Apart from mild annoyance due to traffic disruption and slight impact due to construction noise, significant effects on human health are not likely during construction.

Once operational, the proposed development will have a profound positive effect at a community level by providing wastewater treatment for Arklow. It will relieve relevant restrictions on new development proposals in Arklow, helping the town to achieve planned population and economic growth. It will also relieve the sense of dereliction that currently applies to the eastern waterfront area and have a positive effect on existing and planned residential development in this area and the locational image of local businesses associated with the town's maritime heritage. It will also improve the environment and water quality for water-based recreation such as sailing and rowing, and for tourism generally.

The aspects of the environment which were identified as having the potential to effect human health during the operational phase of the proposed development were traffic, air quality, odour and noise.

The likely significant effects on human health associated with each of the identified potential effects are considered to be negligible.

18 Material Assets

Likely significant effects on material assets have been evaluated during both the construction and operation of the proposed development. Specifically, material assets were considered in the form of:

- Land Use and Properties;
- Electricity;
- Telecommunications;
- Gas;
- Water Supply Infrastructure; and
- Foul and Surface Water Drainage.

A desk study, site visits and site-specific investigations were undertaken to provide the data to compile the description of the existing material assets.

The majority of likely significant effects associated with material assets will be experienced during construction and will consist mainly of local re-routing of existing services and utilities.

All construction activities in the vicinity of existing services and utilities will be carried out in consultation with the relevant service providers and undertaken in compliance with any requirements or guidelines that they may have. The contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and utilities unless this has been agreed in advance with the relevant service provider.

Tunnelling of the proposed sewer along the quays will minimise the risk of interaction with existing utilities at these locations.

Construction of the proposed development will require temporary land take to accommodate construction activities and permanent land take to accommodate specific above ground structures. The temporary acquisition of land is predicted to result in a slight, negative and short-term effect on land-use. Mitigation measures for all land temporarily acquired will involve reinstatement to their original condition so far as is reasonably practicable.

The permanent acquisition of land is predicted to result in a slight, negative and long-term effect on the existing land-owner's due to the compulsory purchase of land. However, a significant, positive and long-term effect on land-use at these locations is predicted by means of physical improvements to the land in question and fulfilment of land-use zoning objectives and land-use classifications.

A Property Protection Scheme will be put in place by Irish Water prior to works commencing on site to ensure that, should any minor cosmetic damage occur as a result of construction activities, suitable remedial works will be undertaken to repair the damage.

During the operation of the proposed development, a slight increase in demand on some service networks, such as electricity, telecommunications and water supply may occur. However, it is anticipated that the existing networks have sufficient capacity to accommodate the operation of the proposed development. No significant effect is therefore predicted during the operation of the proposed development.

Drainage infrastructure will be provided for all buildings on the Wastewater Treatment Plant site and appropriate drainage in the vicinity of the proposed sewers will be maintained throughout Arklow town. Rainwater collection from the roofs of the various buildings will be discharged directly to drain. Therefore, the likely effect of the proposed development on the existing storm water network is considered to be permanent, but not significant.

The proposed development will provide a robust wastewater network across Arklow town that will prevent the current practice of discharging untreated wastewater to the Avoca River and be capable of accommodating future growth in the town. Therefore, there will be a significant, positive and long-term and permanent effect on the wastewater network during the operation of the proposed development.

19 Major Accidents and Natural Disasters

This section presents an assessment of the likely significant negative effects on the environment arising from the vulnerability of the proposed development to risks of major accidents and/or natural disasters.

The site-specific risk assessment identifies and quantifies risks due to the proposed development, focusing on: unplanned, but possible and plausible events occurring during the construction and operation of the proposed development.

An examination of all plausible risks associated with the proposed development was undertaken. The scenario with the highest risk score in terms of a major accident and/or natural disaster during the construction of the proposed development was identified as being ‘flooding of Wastewater Treatment Plant site during the construction of the revetment upgrade.’ The outcome of the assessment identified that this event is ‘very unlikely’ to occur, and will have ‘limited’ consequences should it do so, representing a ‘low risk scenario’.

The construction methodology employed by the contractor will involve replacement of the revetment in sections, which will work to mitigate the risk of flooding in that it will enable the section under construction to be quickly protected during storm events. Further, a detailed Construction and Environmental Management Plan will be prepared prior to the commencement of any works and implemented throughout construction. The Construction and Environmental Management Plan will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary.

The scenarios with the highest risk score in terms of a major accident and/or natural disaster during the operation of the proposed development were identified as being ‘discharge, spillage or longer-term seepage of untreated wastewater, fuel, chemicals solvents etc. into watercourse, sea or groundwater table’, and ‘fire/explosion’. This assessment identified that the event of ‘discharge, spillage or longer-term seepage of untreated wastewater, fuel, chemicals solvents etc. into watercourse, sea or groundwater table’ is ‘unlikely’ to occur, and will have ‘limited’ consequences should it do so, representing a ‘low risk scenario.’ Similarly, this assessment identified that the event of fire/explosion is ‘very unlikely’ to occur, but will have ‘serious’ consequences should it do so, representing a ‘low risk scenario.’

The proposed development has been designed and will be constructed in line with best international current practice and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design.

A maintenance programme will be implemented at the site, in compliance with the conditions of the Wastewater Discharge Authorisation, to ensure that all critical equipment is operating correctly, therefore reducing the risk of major accidents and/or disasters on site.

The storage of diesel in a contained and bunded area on-site will mitigate ‘by prevention’ the risk of surface and/or ground pollution, as well as the risk of fire/explosion resulting from the potential spillage of fuel.

As a further means of mitigation ‘by remedy,’ fire extinguishers will be provided in the Administration building, and an industrial purpose fire hose reel will be installed to service both the Inlet Works Building and the Process Building, in accordance with the relevant standards.

The proposed development will also be subject to a fire safety risk assessment in accordance with Section 19 of the Safety, Health and Welfare at Work Act 2005, which will assist in the identification of any major risks of fire on site, and mitigation of the same during operation of the proposed development.

20 Cumulative and Interactive Effects

Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from and this EIA Report considers:

- the interaction between all of the different permitted and planned projects in the same area in combination with this proposed development; and
- the interaction between the various impacts within this proposed development

Cumulative impacts will consider whether the addition of many minor or significant effects of the proposed development itself or the cumulation of effects of other permitted or planned projects have the potential to result in larger, more significant effects when combined with the effects of the proposed development.

Interactions will consider the interaction between the various environmental aspects, for example the interaction between noise and ecology.

The assessment of likely significant environmental effects associated with the proposed development considered interactions between environmental factors, for example interactions between traffic and noise, and cumulative effects with other development proposals in the local area.

The cumulative and interactions assessment considered the likely significant effects arising from a cumulation of effects associated with the proposed development and other projects in the local area of relevance

Since 2008, some eight developments in the local area have been consented and/or submitted and recorded in the planning system. Given the nature and scale of the developments identified, no cumulative or interactive effects are predicted to occur if any one, or all of these developments occur concurrent to the construction phase of the proposed development.

As outlined in **Section 2.3** herein, there is the potential for physical and temporal overlap between the proposed development and the proposed Arklow Flood Relief Scheme. The proposed development and the proposed Arklow Flood Relief Scheme have therefore been designed having regard to the existence of the other scheme and the potential for interaction, and the design and construction of the overlapping elements of each of the schemes will be implemented in an integrated manner in so far as possible.

This approach ensures that cumulative and interactive effects arising from the construction of the proposed development and the proposed Arklow Flood Relief Scheme are mitigated and avoided in so far as possible.